

What is claimed is:

1. A pharmaceutical composition comprising a liposome associated with at least one polypeptide comprising SEQ ID No : 2 or a fragment or analog thereof.

2. A pharmaceutical composition according to claim 1, wherein said composition comprises a liposome associated with at least one polypeptide comprising SEQ ID No : 2.

10

3. A pharmaceutical composition according to claim 1, wherein said composition comprises a liposome associated with at least one polypeptide consisting of SEQ ID No : 2 or a fragment or analog thereof.

15

4. A pharmaceutical composition according to claim 1, wherein said composition comprises a liposome associated with at least one polypeptide consisting of SEQ ID No : 2.

20

5. A pharmaceutical composition comprising a liposome associated with at least one epitope bearing portion of a polypeptide comprising SEQ ID No : 2 or a fragment or analog thereof.

25

6. A pharmaceutical composition according to claim 5, wherein said composition comprises a liposome associated with at least one epitope bearing portion of a polypeptide comprising SEQ ID No : 2.

30

7. A pharmaceutical composition comprising a liposome associated with at least one isolated polypeptide, wherein said isolated polypeptide is selected from:

- (a) a polypeptide having at least 70% identity to a second polypeptide comprising SEQ ID No : 2 or fragment or analog thereof;
- (b) a polypeptide having at least 80% identity to a second polypeptide comprising SEQ ID No : 2 or a fragment or analog thereof;
- (c) a polypeptide having at least 95% identity to a second polypeptide comprising SEQ ID No : 2 or a fragments or analog thereof;
- 10 (d) a polypeptide comprising SEQ ID No : 2 or a fragment or analog thereof;
- (e) a polypeptide capable of raising antibodies having binding specificity for a polypeptide comprising SEQ ID No : 2 or a fragment or analog thereof;
- 15 (f) an epitope bearing portion of a polypeptide comprising SEQ ID No : 2 or a fragment or analog thereof;
- (g) the polypeptide of (a), (b), (c), (d), (e) or (f) wherein the N-terminal Met residue is deleted; and
- (h) the polypeptide of (a), (b), (c), (d), (e), (f) or (g) wherein
20 the secretory amino acid sequence is deleted.

8. A pharmaceutical composition according to claim 7, wherein said isolated polypeptide is selected from:

- (a) a polypeptide having at least 70% identity to a second
25 polypeptide comprising SEQ ID No : 2;
- (b) a polypeptide having at least 80% identity to a second polypeptide comprising SEQ ID No : 2;
- (c) a polypeptide having at least 95% identity to a second polypeptide comprising SEQ ID No : 2;
- 30 (d) a polypeptide comprising SEQ ID No : 2;
- (e) a polypeptide capable of raising antibodies having binding specificity for a polypeptide comprising SEQ ID No : 2;

(f) an epitope bearing portion of a polypeptide comprising SEQ ID No : 2;

(g) the polypeptide of (a), (b), (c), (d), (e) or (f) wherein the N-terminal Met residue is deleted; and

5 (h) the polypeptide of (a), (b), (c), (d), (e), (f) or (g) wherein the secretory amino acid sequence is deleted.

9. A pharmaceutical composition comprising a liposome associated with at least one isolated polynucleotide, wherein said
10 isolated polynucleotide is selected from:

(a) a polynucleotide encoding a polypeptide having at least 70% identity to a second polypeptide comprising SEQ ID No : 2 or a fragment or analog thereof;

(b) a polynucleotide encoding a polypeptide having at least 80%
15 identity to a second polypeptide comprising SEQ ID No : 2 or a fragment or analog thereof;

(c) a polynucleotide encoding a polypeptide having at least 95% identity to a second polypeptide comprising SEQ ID No : 2 or a fragment or analog thereof;

20 (d) a polynucleotide encoding a polypeptide comprising SEQ ID No : 2 or a fragment or analog thereof;

(e) a polynucleotide encoding a polypeptide capable of raising antibodies having binding specificity for a polypeptide comprising SEQ ID No : 2 or a fragment or analog thereof;

25 (f) a polynucleotide encoding an epitope bearing portion of a polypeptide comprising SEQ ID No : 2 or a fragment or analog thereof;

(g) a polynucleotide comprising SEQ ID No : 1 or a fragment or analog thereof; and

30 (h) a polynucleotide that is complementary to a polynucleotide in (a), (b), (c), (d), (e), (f) or (g).

10. A pharmaceutical composition according to claim 9, wherein said isolated polynucleotide is selected from:

(a) a polynucleotide encoding a polypeptide having at least 70% identity to a second polypeptide comprising SEQ ID No : 2;

5 (b) a polynucleotide encoding a polypeptide having at least 80% identity to a second polypeptide comprising SEQ ID No : 2;

(c) a polynucleotide encoding a polypeptide having at least 95% identity to a second polypeptide comprising SEQ ID No : 2;

(d) a polynucleotide encoding a polypeptide comprising SEQ ID No :
10 2;

(e) a polynucleotide encoding a polypeptide capable of raising antibodies having binding specificity for a polypeptide comprising SEQ ID No : 2;

(f) a polynucleotide encoding an epitope bearing portion of a
15 polypeptide comprising SEQ ID No : 2;

(g) a polynucleotide comprising SEQ ID No : 1 or fragments or analogs thereof; and

(h) a polynucleotide that is complementary to a polynucleotide in (a), (b), (c), (d), (e), (f) or (g).

20

11. A pharmaceutical comprising a liposome associated with chimeric polypeptides comprising two or more polypeptides comprising SEQ ID No : 2 or a fragment or analog thereof, wherein
25 said polypeptides are linked as to formed a chimeric polypeptide.

12. A pharmaceutical composition according to claim 10, wherein said composition comprises a liposome associated with chimeric polypeptides comprising two or more polypeptides
30 comprising SEQ ID No : 2 wherein said polypeptides are linked as to form a chimeric polypeptide.

13. A pharmaceutical composition according to any one of claims 1 to 12, wherein said liposome comprises lipids selected from synthetic phospholipids, bacterial phospholipids and/or cholesterol.

5

14. A pharmaceutical composition according to claim 13, wherein said liposome comprises bacterial lipids extracted from E. coli, N. meningitidis, or N. lactamica.

10 15. A pharmaceutical composition according to any one of claims 1 to 12, wherein said liposome comprises lipids selected from phosphatidyl ethers and esters, glycerides, gangliosides, sphingomyelin, and steroids.

15 16. A pharmaceutical composition according to claim 13, wherein said lipids are selected from:

1,2-Dilauroyl-*sn*-Glycerol-3-Phosphate (DLPA),
Dimyristoyl-*sn*-Glycerol-3-Phosphate (DMPA),
1,2-Dipalmitoyl-*sn*-Glycerol-3-Phosphate (DPPA),
20 1,2-Distearoyl-*sn*-Glycerol-3-Phosphate (DSPA),
1,2-Dioleoyl-*sn*-Glycerol-3-Phosphate (DOPA),
1-Palmitoyl-2-Oleoyl-*sn*-Glycerol-3-Phosphate (POPA),
1,2-Dilauroyl-*sn*-Glycerol-3-Phosphocholine (DLPC),
1,2-Ditridecanoyl-*sn*-Glycerol-3-Phosphocholine,
25 1,2-Dimyristoyl-*sn*-Glycerol-3-Phosphocholine (DMPC),
1,2-Dipentadecanoyl-*sn*-Glycerol-3-Phosphocholine,
1,2-Dipalmitoyl-*sn*-Glycerol-3-Phosphocholine (DPPC),
1,2-Diheptadecanoyl-*sn*-Glycerol-3-Phosphocholine,
1,2-Distearoyl-*sn*-Glycerol-3-Phosphocholine (DSPC),
30 1,2-Dimyristoleoyl-*sn*-Glycerol-3-Phosphocholine,
1,2-Dipalmitoleoyl-*sn*-Glycerol-3-Phosphocholine,
1,2-Dioleoyl-*sn*-Glycerol-3-Phosphocholine (DOPC),

1-Myristoyl-2-Palmitoyl-*sn*-Glycerol-3-Phosphocholine,
 1-Myristoyl-2-Stearoyl-*sn*-Glycerol-3-Phosphocholine,
 1-Palmitoyl-2-Myristoyl-*sn*-Glycerol-3-Phosphocholine,
 1-Palmitoyl-2-Stearoyl-*sn*-Glycerol-3-Phosphocholine,
 5 1-Palmitoyl-2-Oleoyl-*sn*-Glycerol-3-Phosphocholine (POPC),
 1-Palmitoyl-2-Linoleoyl-*sn*-Glycerol-3-Phosphocholine,
 1,2-Dilauroyl-*sn*-Glycerol-3-Phosphoethanolamine (DLPE),
 1,2-Dimyristoyl-*sn*-Glycerol-3-Phosphoethanolamine (DMPE),
 1,2-Dipalmitoyl-*sn*-Glycerol-3-Phosphoethanolamine (DPPE),
 10 1,2-Dipalmitoleoyl-*sn*-Glycerol-3-Phosphoethanolamine,
 1,2-Distearoyl-*sn*-Glycerol-3-Phosphoethanolamine (DSPE),
 1,2-Dioleoyl-*sn*-Glycerol-3-Phosphoethanolamine (DOPE),
 1-Palmitoyl-2-Oleoyl-*sn*-Glycerol-3-Phosphoethanolamine (POPE),
 1,2-Dilauroyl-*sn*-Glycerol-3-[Phospho-RAC-(1-glycerol)] (DLPG),
 15 1,2-Dimyristoyl-*sn*-Glycerol-3-[Phospho-RAC-(1-glycerol)] (DMPG),
 1,2-Dipalmitoyl-*sn*-Glycerol-3-[Phospho-RAC-(1-glycerol)] (DPPG),
 1,2-Distearoyl-*sn*-Glycerol-3-[Phospho-RAC-(1-glycerol)] (DSPG),
 1,2-Dioleoyl-*sn*-Glycerol-3-[Phospho-RAC-(1-glycerol)] (DOPG),
 1-Palmitoyl-2-Oleoyl-*sn*-Glycerol-3-[Phospho-RAC-(1-glycerol)]
 20 (POPG),
 1,2-Dilauroyl-*sn*-Glycerol-3-[Phospho-L-Serine] (DLPS),
 1,2-Dimyristoyl-*sn*-Glycerol-3-[Phospho-L-Serine] (DMPS),
 1,2-Dipalmitoyl-*sn*-Glycerol-3-[Phospho-L-Serine] (DPPS),
 1,2-Distearoyl-*sn*-Glycerol-3-[Phospho-L-Serine] (DSPS),
 25 1,2-Dioleoyl-*sn*-Glycerol-3-[Phospho-L-Serine] (DOPS), and
 1-Palmitoyl-2-Oleoyl-*sn*-Glycerol-3-[Phospho-L-Serine] (POPS).

17. A pharmaceutical composition according to claim 13,
 wherein said liposome further comprises at least one adjuvant
 30 selected from Lipid A, monophosphoryl lipid A (MPLA),
 lipopolysaccharides, and cytokines.

18. A pharmaceutical composition according to claim 13, wherein said liposome comprises 0 to 25% cholesterol.

19. A pharmaceutical composition according to any one of 5 claims 1 to 18, wherein said composition further comprises a pharmaceutically acceptable adjuvant.

20. A method for inducing an immune response against N. meningitidis, in a host, comprising administering to said host an 10 immunogenically effective amount of a pharmaceutical composition according to any of claims 1 to 19 to elicit an immune response.

21. A method for preventing and/or treating a N. meningitidis infection comprising administering to a host in need thereof a 15 prophylactic or therapeutic amount of a pharmaceutical composition according to any of claims 1 to 19.

22. A method for preventing and/or treating a neisserial infection selected from N. meningitidis, N. gonorrhoeae, N. lactamica and N. polysaccharea comprising administering to a host 20 in need thereof a prophylactic or therapeutic amount of a pharmaceutical composition according to any of claims 1 to 19.

23. A method for the treatment or prophylaxis of meningitidis 25 and meningococcemia, in a host, comprising administering to said host an effective amount of a pharmaceutical composition according to any of claims 1 to 19.

24. A method according to any one of claims 20 to 23, wherein 30 said host is a mammal.

25. A method according to claim 24, wherein said host is a human.

26 A method according to claim 25, wherein said host is an 5 adult human.

27. A method according to any one of claims 20 to 26 wherein said are administered in unit dosage form of about 0.001 to 100 µg/kg (antigen/body weight) with an interval of about 1 to 6 week 10 intervals between immunizations.

28. A diagnostic method for detecting N. meningitidis organism in a biological sample, comprising:

- a) obtaining a biological sample from a host;
- 15 b) incubating an antibody or fragment thereof reactive with a pharmaceutical composition according to any one of claims 1 to 19 with the biological sample to form a mixture; and
- 20 c) detecting specifically bound antibody or bound fragment in the mixture which indicates the presence of N. meningitidis.

29. A diagnostic method for detecting N. meningitidis organism in a biological sample, comprising:

- 25 a) obtaining a biological sample from a host;
- b) incubating a pharmaceutical composition according to any one of claims 1 to 19 with the biological sample to form a mixture; and
- 30 c) detecting specifically bound antigen or bound fragment in the mixture which indicates the presence of antibody specific to N. meningitidis.

30. A diagnostic method for detecting N. meningitidis organism in a biological sample, comprising:

- a) obtaining the biological sample from a host;
- 5 b) incubating one or more DNA probes having a DNA sequence encoding a polypeptide comprising SEQ ID No : 2 or a fragment thereof with the biological sample to form a mixture; and
- 10 c) detecting specifically bound DNA probe in the mixture which indicates the presence of N. meningitidis bacteria.

31. A diagnostic method for detecting N. meningitidis in a host comprising:

- 15 a) labelling an antibody reactive with a pharmaceutical composition according to any one of claims 1 to 19 with a detectable label;
- b) administering the labelled antibody to the host; and
- 20 c) detecting specifically bound labelled antibody or labelled fragment in the host which indicates the presence of N. meningitidis.

32. Use of a pharmaceutical method according to any one of claims 1 to 19 for the prophylactic or therapeutic treatment of N. meningitidis infection in an individual susceptible to N. meningitidis infection comprising administering to said individual a therapeutic or prophylactic amount of said.

33. A kit comprising a according to any one of claims 1 to 30 19 for detection of diagnosis of N. meningitidis infection.